

# Amino Acid and Peptide Salts for CO<sub>2</sub> Removal

Bingyun Li,<sup>\*,#</sup> Bingbing Jiang,<sup>\*</sup> Daniel Fauth,<sup>^</sup> McMahan Gray,<sup>^</sup> Henry Pennline,<sup>^</sup> George Richards<sup>&</sup>

<sup>\*</sup>Department of Orthopaedics, School of Medicine, WVNano Initiative, West Virginia University, Morgantown, WV 26506

<sup>#</sup>National Energy Technology Laboratory – Institute for Advanced Energy Solutions

<sup>^</sup>US DOE, NETL, Pittsburgh, PA 15236; <sup>&</sup>US DOE, NETL, Morgantown, WV 26507

## Research or Market Need:

- Fossil fuels — the main energy supply in the world.
- Approximately 36% of the U.S.'s anthropogenic CO<sub>2</sub> is produced from fossil-fuel-burning power plants.
- Current CO<sub>2</sub> capture approaches (e.g. MEA) are toxic and have high inherent operating costs.
- Global warming !!! Global climate change initiative (2002).
- Our goal is to develop advanced (e.g. *low toxicity, rapid* CO<sub>2</sub> transport, *high* CO<sub>2</sub> capture capacity) solid sorbents to capture CO<sub>2</sub>.

## Our Approach and its Advantages:

- Develop a new type of solid sorbents with *high biocompatibility* to human being and environment, *high oxygen stability* and *high capacity* for CO<sub>2</sub> capture, using amino acids and peptides.
- Amino acids and peptides are unique and could be the best candidates for CO<sub>2</sub> removal: *biocompatible, superior oxygen stability, negligible volatility, superior capacity, versatility*, and may be “*friendly*” to enzymatic catalysts. They may also enhance selectivity of membranes.

**Benefits:** Our developed amino acid and peptide sorbents may lead to safely and economically capturing of CO<sub>2</sub>, and may lead to breakthroughs in CO<sub>2</sub> capture technologies.

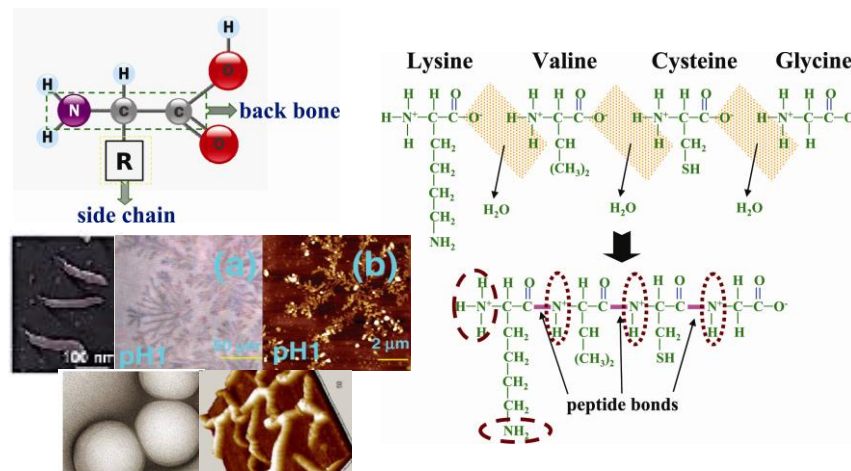


Fig. 1. Amino acid, peptide, and their unique structures and products.

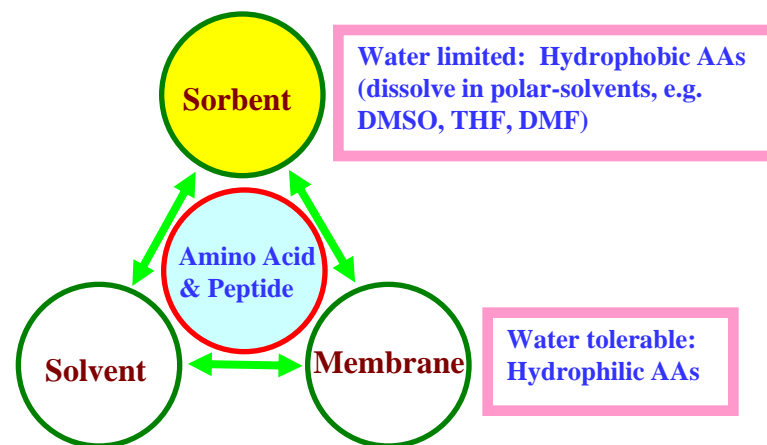


Fig. 2. Concept: Amino acids and peptides applied in sorbent, solvent and membrane systems for CO<sub>2</sub> removal.